

**AMENDMENTS TO THE CLAIMS**

1. (Currently Amended) A capacitive position sensor configured for interconnection to a utilization device, comprising:

a stationary signal-detecting capacitor plate;

a stationary signal-transmitting capacitor plate supported parallel to, and spaced apart from, the signal-detecting capacitor plate, the transmitting capacitor plate being divided into a plurality of electrically separated segments;

a non-circular, movable dielectric element disposed between the signal detecting and signal-transmitting capacitor plates;

an elongate member having a user-manipulable proximal end and a distal end coupled to the dielectric element, the member being operative to rotate and laterally shift the element in the x or y directions in a plane substantially parallel to the stationary plates as a function of user position;

circuitry in electrical communication with the stationary plates, the circuitry being operative to (a) measure the capacitance between each segment of the signal-transmitting plate and the signal-detecting plate, and (b) determine user the position of the elongate member in the x or and y directions as a function of the measured capacitance, and (c) determine rotation of the elongate member as a function of the measured capacitance, with or without lateral shifting of the dielectric element; and

an output for communicating the user x-y position and rotation to the utilization device.

2. (Original) The position sensor according to claim 1, wherein the utilization device is a computer.

3. (Original) The position sensor according to claim 1, wherein the elongate member is a user-graspable joystick.

4. - 5. (Canceled)

6. (Original) The position sensor according to claim 1, wherein the segments of the signal-transmitting plate are arcuate.

7. - 10. (Canceled)

11. (Currently Amended) A capacitive-based joystick configured for interconnection to a utilization device, comprising:

a housing having a top surface;

a stationary signal-detecting capacitor plate disposed within the housing;

a stationary signal-transmitting capacitor plate disposed within the housing parallel to, and spaced apart from, the signal-detecting capacitor plate, the transmitting capacitor plate being divided into a plurality of electrically separated segments;

a non-circular, movable dielectric element disposed within the housing between the signal-detecting and signal-transmitting capacitor plates;

a joystick lever supported for pivotal movement having a proximal end for user engagement and a distal end ~~which extends through the top surface of the housing and at least one of the signal-detecting and signal-transmitting capacitor plates,~~ loosely coupled to the dielectric element, enabling the lever to rotate and laterally shift the dielectric element in x and y directions in a plane substantially parallel to the stationary plates as a function of user position;

circuitry in electrical communication with the stationary plates, the circuitry being operative to (a) measure the capacitance between each segment of the signal-transmitting plate and the signal-detecting plate, and (b) determine user the position of the elongate member in the x or and y directions as a function of the measured capacitance, and (c) determine rotation of the elongate member as a function of the measured capacitance, with or without lateral shifting of the dielectric element; and

an output for communicating the user position to the utilization device.

12. (Original) The joystick according to claim 11, wherein the utilization device is a computer.

13. - 14. (Canceled)

15. (Original) The joystick according to claim 11, wherein the segments of the signal-transmitting plate are arcuate.

16. (Original) The joystick according to claim 11, wherein the plurality of electrically separated segment includes 3 or 4 arcuate segments.

17. (Canceled)

18. (Currently Amended) The position sensor according to claim [[5]] 1, wherein the dielectric element is oval or egg-shaped.

19. (Previously Presented) The position sensor according to claim 1, wherein the plurality of electrically separated segment includes 3 or 4 arcuate segments.

20. (Currently Amended) ~~The position sensor according to claim 1, wherein:~~ A capacitive position sensor configured for interconnection to a utilization device, comprising:

a stationary signal-detecting capacitor plate;

a stationary signal-transmitting capacitor plate supported parallel to, and spaced apart from, the signal-detecting capacitor plate, the transmitting capacitor plate being divided into a plurality of electrically separated segments;

a movable dielectric element disposed between the signal detecting and signal-transmitting capacitor plates;

a user-manipulable member operative to laterally shift the dielectric element in a plane substantially parallel to the stationary plates as a function of user position;

circuitry in electrical communication with the stationary plates, the circuitry being operative to (a) measure the capacitance between each segment of the signal-transmitting plate and the signal-detecting plate, and (b) determine the user position of the user-manipulable member as a function of the measured capacitance;

the segments of the signal-transmitting plate ~~are being~~ arranged as parallel segments in one direction; and

wherein user manipulation of the ~~first end of the~~ member causes the dielectric element to laterally shift in that direction relative to the parallel segments.

21. (Currently Amended) The position sensor according to claim 1, wherein:

the elongate member includes a pivoting coupling between the first and second ends; and

the distal end of the elongate element is loosely coupled to the dielectric element so that the dielectric element remains in a plane substantially parallel to the stationary plates as the dielectric element is rotated or laterally shifted.

22. (Currently Amended) The position sensor according to claim 1, wherein:

the movement of dielectric element is constrained by the spacing of stationary plates so that the dielectric element remains in a plane substantially parallel to the stationary plates as the dielectric element is rotated or laterally shifted.

23. -26. (Canceled)

27. (New) The capacitive position sensor according to claim 1, wherein the dielectric element has a periphery described by:

$$r(\theta) = r_0 + a_2 \cos(2\theta) + a_3 \cos(3\theta).$$

28. (New) The joystick according to claim 11, wherein the dielectric element has a periphery described by:

$$r(\theta) = r_0 + a_2 \cos(2\theta) + a_3 \cos(3\theta).$$

29. (New) The capacitive position sensor according to claim 20, wherein the user-manipulable member includes a T-shaped handle.

30. (New) The capacitive position sensor according to claim 20, further including:

a computer mouse housing having an upper surface; and  
wherein user-manipulable member extends through the upper surface of the housing forming a scroller lever or wheel.

31. (New) The capacitive position sensor according to claim 20, wherein:

the dielectric element is non-circular, enabling the circuitry to determine twisting of the of the user-manipulable member as a function of the measured capacitance, with or without lateral shifting of the dielectric element.

32. (New) A capacitive position sensor configured for interconnection to a utilization device, comprising:

a pair of assemblies, each including:

a stationary signal-detecting capacitor plate,

a stationary signal-transmitting capacitor plate supported parallel to, and spaced apart from, the signal-detecting capacitor plate, the transmitting capacitor plate being divided into a plurality of electrically separated segments,

a non-circular moveable dielectric element disposed between the signal detecting and signal-transmitting capacitor plates,

an elongate member having a shaft and a distal end coupled to the dielectric element, the member being operative to rotate the dielectric element in a plane substantially parallel to the stationary plates as a function of user position,

the shaft of one of the elongate members being substantially perpendicular to the shaft of the other;

a user-manipulable member operative to rotate one or both of the shafts; and

circuitry in electrical communication with all of the stationary plates, the circuitry being operative to (a) measure the capacitance between each segment of the signal-transmitting plate and the signal-detecting plate associated with each one of the assemblies, and (b) determine the position of the user-manipulable member as a function of the measured capacitance; and

an output for communicating the position of the user-manipulable member to the utilization device.

33. (New) The position sensor according to claim 32, wherein the user-manipulable member is a ball having an outer surface that frictionally engages with both of the shafts.

34. (New) The position sensor according to claim 33, wherein:  
the assemblies form part of a computer mouse having a housing; and  
a portion of the outer surface of the ball extends beyond the surface of the housing.

35. (New) The position sensor according to claim 33, wherein the utilization device is a computer.

36. (New) The position sensor according to claim 1, wherein the segments of the signal-transmitting plate are arcuate.